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ABSTRACT

Interactive decision making (IDM) refers to teachers' selection and rejection of alternative courses of action during instruction. Previous research indicates that teachers report making interactive decisions when their plans are disrupted. A study generated hypotheses about teachers' IDM using the grounded theory approach--an inductive system for generating interrelated hypotheses grounded in the empirical. Twelve elementary school teachers conducted lessons in their classrooms and recorded them on audiotape. Within 48 hours of the lesson, these teachers were interviewed using the stimulated-recall technique. These interviews were audiotaped and transcribed. Ideational units were compared and contrasted, categories were constructed--all followed by numerous returns to the data where categories and then hypotheses were revised using the constant comparative technique. Three hypotheses were generated: (1) Teachers' IDM is embedded in classroom learning activities; (2) Teachers' intentions during interactive teaching are to move learning activities forward to completion; and (3) This intention is supported by IDM routines. A concluding discussion points to learning activities as mediators of the structural tension between unlimited subject matter and limited time. Implications for the implementation of curricular innovations are suggested. (Author/JD)

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A GROUNDED THEORY STUDY OF TEACHERS' DECISION MAKING

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ABSTRACT

Appropriate teacher behavior appears to be largely a function of teachers' thinking and, particularly, their decision making. Interactive decision making (IDM) is a subset referring to teachers' selection and rejection of alternative courses of action during instruction. Previous research indicates teachers report making interactive decisions when their plans are disrupted. This study generated hypotheses about teachers' IDM using the grounded theory approach--an inductive system for generating interrelated hypotheses grounded in the empirical. Twelve elementary teachers conducted lessons in their classroom and recorded them on audiotape. Within 48 hours of the lesson, these teachers were interviewed using the stimulated-recall technique. These interviews were audiotaped and transcribed. Ideational units were compared and contrasted, categories were constructed, and hypotheses generated--all followed by numerous returns to the data where categories and then hypotheses were revised using the constant comparative technique. Three hypotheses were generated: Teachers' IDM is embedded in classroom learning activities, teachers' intention during interactive teaching is to move learning activities forward to completion, and this intention is supported by IDM routines. A concluding discussion points to learning activities as mediators of the structural tension between unlimited subject matter and limited time. Implications for the implementation of curricular innovations are then suggested.

A GROUNDED THEORY STUDY OF TEACHERS' DECISION MAKING

Walter C. Parker
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It is clear that the largely behavioral process-product research, for all its contributions to research on teaching, is conceptually limited. It tells us much about effective teaching behaviors, but little about their implementation--little about how teachers might apply those behaviors in daily classroom life.

Classroom research derived from the ecological perspective (Doyle, 1977), has made it very clear that classrooms are fluid, complex social systems in which there is no "one best way" for teachers to behave. Teachers need a wide variety of behaviors which can be used as appropriate--with these, not those students; at this, not that time; with these, not those circumstances. Appropriate teacher behavior, it has been proposed, is a function of teacher's thinking (Clark & Yinger, 1977) and, particularly, their decision making (Medley, 1981; Shavelson, 1973). According to Shavelson,

> There is no "correct" teaching act for (a particular) situation. A teacher may possess a full range of teaching skills, but if he is unable to determine those situations in which a particular skill or subset of skills is appropriate, the consequences of his blindly carrying out those skills alone may not be those intended (1981, p.3).

A subset of teachers' decision making is their interactive decision making (Clark & Yinger, 1977). This refers to decisions teachers make during, as opposed to before and after, instruction. Interactive decision making (IDM) is that cognition which results in teachers'

on-the-spot selection of particular teaching behaviors. It is the process of selecting and rejecting alternative courses of action during instruction. Among the more interesting research findings on teachers' IDM is that which links it to preactive decision making. Teachers seem to formulate preactively images (Morine-Dershimer, 1978-79) which are carried into the interactive phase of teaching as mental scripts for instruction. They are usually played out until they or the time available end (Joyce, 1978-79). Teachers generally report making interactive decisions only when their images are disrupted--when the lesson is perceived to be going poorly (Clark & Joyce, 1975; Peterson & Clark, 1978).

Many questions persist about the function of teachers' IDM. Why does it seem to appear only when teachers' images are disrupted? Is it not occurring at other times? Or, does it occur unnoticed? Is more IDM better than less? Do more effective teachers exhibit different IDM patterns? Do certain types of lessons and certain groups of students require certain modes of IDM? To begin to explore this array of questions, a grounded theory study of teachers' IDM was undertaken.

Procedure

Advanced by sociologists Glaser and Strauss (1967) and employed in a number of education dissertations (Anderson, 1983; Baumgartner-Papageorgion, 1983; D'Lamater, 1975; Janke, 1982; Kangwanshirathada, 1983; Kitchens, 1983; Thompson, 1979), the grounded theory approach is an inductive system for generating interrelated hypotheses grounded, or based, in the empirical. In general, before any hypotheses are defined, data are collected, coded, and arranged into theoretical concepts (categories) and the elements of these concepts (properties). Then, an analysis of these categories and their properties is made to develop working hypotheses and provide

direction for the next stage of data collection. Alternating stages of data collection and analysis follow, in which later data are collected and compared with the tentative categories and hypotheses. The theory is presented to others when this constant comparison has produced a condition that Glaser and Strauss call "saturation"--when terminology has been established, modification of the categories and properties has decreased, and interrelationships have been identified. Published studies, such as those by Browning (1978), Conrad (1978), Gehrke (1981, 1982), and Gehrke and Parker (1983), and Gilchirst and Browning (1981) each describe the constant comparative method of alternate data collection and analysis.

To generate hypotheses in this study, twelve inservice teachers were drawn randomly from the elementary teachers of a suburban Denver school district. They conducted a lesson of their choosing in their natural classrooms and recorded the lesson on audiotape. Within 48 hours of the lesson, the teachers were interviewed using the stimulated-recall technique (Bloom, 1953, 1954; Tuckwell, 1980). During the interviews, teachers were asked to replay the recording of their lesson, to stop the tape each time they remembered making a decision, and to describe in detail that decision point. These interviews were, in turn, recorded on audiotape and later transcribed.

The interview protocols were then analyzed. Similarities and differences in ideational units were identified, compared, and contrasted. Then, categories were identified and, from these, hypotheses generated. The first round of data analysis was followed by returns to the protocols

to compare and contrast ideational units, identify additional categories, reinforce and modify previous categories, and substantiate formatively the emerging hypotheses. This process continued until the categories approached saturation. At that point, hypotheses were again revised and are presented below.

Hypotheses

In this section, three hypotheses generated thus far in the study of these protocols are discussed. Each was derived from numerous returns to the data and categories, and, as is the case with all hypotheses,each is tentative.

Hypothesis #1. Teachers' IDM is embedded in classroom learning activities. By "embedded," we mean that teachers' IDM is situated within, shaped by, and given meaning by learning activities. By "learning activity," we are referring to the "means by which teachers bring students into contact with subject matter" (Zahorik, 1982, p. 309-10).

Initial categorization placed teachers' IDM into two predominant categories: subject matter-related IDM versus classroom management-related IDM. The former included statements like, "I made a decision to connect the reading with what they do in our labs, to try to find the main ideas." The latter included statements like, "___was playing around with ___ under the table, so I chose to have her read the paragraph so she'd be more involved." However, this distinction was deceiving. It obfuscated their common ground. Content-related and management-related IDM appeared to be discrete cognitions or in some manner oppositional only when stripped of their context: the learning

activity at hand. Virtually all of the IDM reported by the teachers in our sample was defined by the present learning activity. A few excerpts should illustrate the point.

1. One teacher was having students take turns reading from a science text. Typical of the sorts of decisions reported by this teacher were:

a) "I guess there was a decision, to continue (with the) reading... I guess I'd said whatever I had to say to clarify what single-celled animals were, and then I wanted to go onto the next point.

b) "___ has got a speech problem, and I made a decision to have her say the word over again."

c) "I (decided to) write on the board...I wanted to show them how cells divide and reproduce."

d) "I make a decision each time I choose a kid to read...I called on ___. I don't remember why."

e) "Ok, I called on ___ yesterday; he was one of the kids who was able to say the big words...So, when I called on him again, I figured he could say it."

f)"They didn't know what it meant, so I had to re-read the paragraph..."

g) "I didn't think they were understanding what had been read, so by asking them to say it again, (I was) asking them to be accountable for something."

h) "I made a decision to ask them to tell me what ___ had just read. I was looking for comprehension of what she read because it was a long part, and they might fall asleep."

2. Another teacher was at the board explaining the concept, bar graph, to her students.

a) "There was a decision. Originally, when I went up (to the board), I was going to go ahead and give them population figures. Then, I decided that I would probably keep them with me better if we did something that was more interesting to them, so right there I quickly changed to cars and their cost."

b) "There, I had to take time out to say something to get them calmed down."

c) "Again, because of the subject we were talking about, they got excited, excited about the cars and how much they cost. And, in order to keep a hold on it, I decided to take the time to say, 'That's not what we are going to do, people.'"

d) "We were going nowhere. The kids were so far off (on their guesses about the cost of cars). I mean, they had everything from 2 million to 8 thousand. So, I decided to say, 'Ok, let's see if you have a better idea of the cost of cars you know more about...and see if we can some up with something a little more rationale.'"

e) "There was a decision to get (from students) a nice diversity in prices so that they would have to really think about how to figure the bar graph...I was trying to make it hard enough so that they would get an idea of how to do it when they have to do the one next week."

As these excerpts reveal, interactive decisions are embedded in the academic as well as the organizational/managerial features of learning

activities. The teacher leading the text-based science lesson was compelled by virtue of the academic and managerial nature of the activity to make decisions related to illustrating key ideas on the board, deciding who would read next, deciding when to repeat passages, and deciding how to enforce the norms inherent in an activity of this sort (e.g., listening to one another read). The second teacher likewise had to make academic and managerial decisions that were interdependent. Her decisions, however, were embedded in an oral question and answer activity about bar graphs and car costs; consequently, she was compelled to make decisions about soliciting rather than giving prices, about how to solicit "rational" responses, how to raise their interest in graphs, and how to make the graphing practice sufficiently difficult.

The defining attributes of learning activity appear to be subject matter, student thinking processes, student responses, the teacher's elciting behaviors, and the teacher's cognitive representations, or image, of the activity. The latter attribute, the teacher's image of the activity, specifies the form of the other 4 attributes. The image of the first teacher was students reading aloud from their science texts when called upon, listening to one another, and comprehending the text material. This teacher selected teacher behavior that seemed to her likely to bring the image into reality. The second teacher sought to realize her image of students being interested, yet calm, while generating a "nice diversity" of "rational" prices in response to sufficiently "hard" questions about car costs and bar graphs.

It is evident in the protocols that teachers' IDM is embedded at the intersection of these attributes. For this reason, it was a rare decision that could be classified as relating primarily to one attribute or another. For example, decision (h) reported by the first teacher contains all attributes. The same is true of decision (e) reported by the second teacher.

Hypothesis #2. Teachers' intention during interactive teaching is to move learning activities forward to completion, that is, to the fulfillment of the image; their IDM is the cognitive capital they bring to bear on this task.

The category of IDM that matured with each return to the data is what was eventually called a "forward." A forward is a decision to move the learning activity ahead, in time, to completion. A few excerpts will illustrate the category:

1. Teacher #10.

   -"We have gone through all our rules. After that, we went into passing out the write-ups from the expert group. I guess the decision there was to finish up discussing rules and what we need to do in group, and then change to what we do next...They have finished what they were doing, and it is time to go on with something."

   -"Enough had gotten themselves seated and the (write-ups) passed out to focus their attention on getting into what they had to do. I was trying to say, "When you are quiet, we will start.'"

   -"The kids were complaining about the fact that they couldn't read (the photocopies of the write-ups), so we had to discuss

what we could do--how we could work around that fact...I very simply said, 'Well, this is the way it's going to have to be.'"

-"I decided to go around to the groups that were needing more help in hurrying up and finishing up the work...They were needing more leadership in solving their problems and getting things done so we could continue to the next phase."

2. Teacher #4.

-"I wanted to get them back on the topic right there, and so I decided to call them back to animals instead of gorillas."

-"They were going in different directions and getting farther away from me, and so I wanted them to stick to the subject and stay with animals in our area."

-"We had dwelled long enough on that and were not getting too close, so I moved to redirect them, sticking to our topic a little more."

3. Teacher #6.

-"I had just looked at the clock and thought, man, I had better get on with the filmstrip. It was a decision that I've just got to stop this conversation short and get on with the next thing."

-One technique I use as a teacher is I personalize things a lot... A quick decision here was to decide what I was going to do to wrap things up, so I decided the point would be told personally--no questions asked--because I just didn't have time. So, I had to find a way to wrap it up and make it stick."

The large number of forwards in the interactive protocols reveals the prominence of the scarcity of time in teachers' thinking. Scarce time is apparently perceived as the chief threat to the realization of teachers' images.

Hypothesis #3. Teachers' intention to move learning activities forward to completion is supported by their decision-making routines. If a decision is the selection of an alternative from two or more alternatives when confronted with some perceived need, then a decision-making routine might be considered a preselected alternative generated without consideration of alternatives when a need arises. For example, when a learning activity is to begin, a teacher might routinely give an advanced organizer and then take roll; another might routinely do the reverse. When in the middle of a learning activity, a teacher might routinely refocus off-focus responses or routinely indulge them. At the end of a learning activity, a teacher might routinely check for understanding, give a verbal summary, or say, "Ok. Enough for today." Decision-making routines apparently simplify the teaching act by reducing interactive cognitive demands.

The protocols indicate that decisions to move an activity forward often fall into routines, and the forward routines most often reported in the protocols were those which helped teachers move through the middle of a learning activity. These routines were often, though not always, activated when the teacher perceived a threat to the image governing the learning activity--that is, when student thinking and responding were other than what the image called for. These routines appeared invaluable for moving an activity forward. Examples include:

1. Teacher #4: (reporting routine tc refocus student responding):
"They're getting off the topic...They tend to wander so much. You have to pull them back and get them directed and focused or you've lost them."

2. Teacher #5 (reporting routine to repeat facts before asking a higher order question):
"I repeat an awful lot, and the decision (here) is to go back over it so they know all the facts fresh, because I am now getting ready to ask them the similarities-and-differences question."

3. Teacher #6 (reporting routine of doing things in "threes"):
"I always do things in threes. So, I said, 'Ok, (since you are not sure of the answer) you're going to get three guesses."

4. Teacher #10 (reporting routines for getting around unexpected obstacles):
"We discussed how we could work around the fact that we couldn't read it as well as perhaps we normally could. Then I said, 'Well, this is the way it's going to have to be...That's the way life goes.'"
"I was going around putting out brushfires."
"So, we put it to a vote."

5. Teacher #7 (reporting routine to keep students' attention):
"I tell them differently how to head their papers each time, because I want them to be listening."

6. Teacher #8 (reporting routine for calling on students to respond):
"I try to call on different levels of kids."

IDM routines seem to fall toward opposite ends of a semantic-nonsemantic continuum (Bransford et al., 1977). That is, while virtually all routines are dedicated to moving an activity forward, some elicit from students the kind of thinking and responding that facilitates greater understanding of the content while others seem concerned almost solely with "getting the work done." Some routines press for learning and completion of the activity; others press just for completion.

A fitting analogy may be that of two cross-country travelers. Both are traveling by automobile, and both want to arrive eventually on the west coast. Both feel the heavy hand of time and are inclined, therefore, to travel by interstate highway. However, there is a difference. Traveling with one, you would rarely leave the interstate, and then only briefly. Traveling with the other, you would more often leave the interstate to get to know the country. Leaving the expressway does not, per se, take the driver and companion off focus, for they are still heading west, but it provides them an opportunity to achieve something beyond a surface (nonsemantic) understanding of the territory.

There might be two reasons neither driver is likely to leave the expressway often. One is the reality of lost time, and the other is the risk of getting lost in the unknown countryside. The expressway is better known and predictable; the side roads are not.

Only two of the teachers interviewed left the expressway often, and it is interesting to note that both had distinctive decision-making routines they used to manage the side roads. One was the teacher who led the mapping-the-school activity. Rather than providing direct instruction on maps and map-making, she was engaging the students in an experience-based, inquiry

activity. Less known to both teacher and students, this was a relatively high-risk route. But, the teacher used routines to maintain student thinking and responding within the boundaries of her image and thus keep the activity moving forward. First, using her "rule of threes," she initiated the activity with a rule routine involving the direct instruction of three rules. Second, she used a routine during the map work with which students were referred to the rules as needed.

The other teacher was leading an activity about Christmas in Sweden and the United States. After showing a film, he led a question and answer activity during which he wanted to elicit "complete responses" from his students in which they would tell him the similarities and differences between the two countries. Were he solely an expressway teacher, he would probably have shown the film and "moved on," perhaps with a comfortable worksheet routine. However, this teacher wanted his students to engage in what he considered to be a higher order of thinking. He wanted them to verbalize similarities and differences between the holidays in the two countries. His routine was to teach students to use a response pattern he had learned in an inservice course. The pattern helped them put their thinking into words, and their words into the complete response he envisioned. Both teachers took time and risks to optimize their students' learning. They did this by implementing unusual learning activities containing decision-making routines with which the activities were moved successfully to completion.

Discussion

These grounded hypotheses strengthen the proposition that learning activities are the basic units of classroom instruction. Earlier thinking that an objective was this unit has already been refuted by researchers who found scant reference to it in teachers' planning or interactive thinking (Morine, 1976; Peterson, Marx, and Clark, 1978; Yinger, 1979). The learning activity is now widely considered "the basic treatment unit in classrooms" (Doyle, 1983, p.162) and "the basic structural unit of planning and action in the classroom" (Yinger, 1979, p.164). The hypotheses generated in the present study extend this conception of learning activities by including teachers' IDM as a derivative and central feature. While much attention to learning activities thus far has emphasized the impact of the activity on students, their thinking and products, this study proposes the salient impact of the activity on teachers. Teachers' IDM is not something external and generic that teachers carry into learning activities; rather, it is located within learning activities. Consequently, a teacher's preactive selection of a learning activity is a fateful decision because it defines to an important degree that teacher's interactive cognition.

This link between IDM and learning activities appears to stem particularly from the inherent conflict in classroom instruction between limited time and unlimited subject matter. Some sort of mediation is inevitably needed through which this structural tension is reduced. Learning activities, we are proposing, accomplish this mediation, and IDM is the means by which teachers attempt to control them. In summary, IDM is situational. Embedded in learning activities, it plays perhaps

the central role in interactive instruction by mediating the time/content conflict.

IDM in learning activities appears to be highly routinized. It should be no surprise, therefore, that previous studies have found that teachers report interactive decisions only when their image of the learning activity is disrupted. These findings should not be interpreted to mean that teachers are not making decisions except when their mental scripts are punctured; it is more likely that their decision making is throughly routinized, and that they tend to report making decisions only when the decision-making process is brought into awareness--when a particular routine is not delivering the image (see Yinger, 1977).

Furthermore, because IDM during learning activities appears to be routinized, it should not be surprising that teachers seem rarely to leave the "expressway" to meander where decision-making routines are less crytallized. The risks accompanying leaving routinized activities (the risks of time/content loss as well as student misbehavior), render very understandable teachers' reluctance to leave their tried (if not so true) activities. Leaving routinized activities is literally asking for trouble.

Of course, this reluctance is unfortunate because less traditional activities for which decision-making routines have not been so widely established are precisely what is needed for the successful implementation of many curriculum innovations. A valuable sort of inservice education would help teachers establish decision-making routines needed to conduct innovative learning activities. In social studies, decision-making routines are needed for leading open discussions of controversial issues; in science,

decision-making routines are needed for leading "process-oriented" science activities; in physical education, decision-making routines are needed for leading activities which teach motor skills. Across subject areas, teachers need to establish routines for leading concept-formation activities, moral dilemma discussions, and classroom rule-teaching activities. Routines are also needed for leading critical thinking activities, for achieving a more equitable distribution of student participation in activities, and for engaging students in problem-solving activities. Like the teacher above who managed successfully the map-making inquiry activity by using her "three rules" routine, or the teacher who led a complex similarities-and-differences activity by utilizing a practiced sequence of questions, teachers can learn routines which stabilize innovative activities while moving them toward completion.

Conclusion

This was the first grounded theory research study of teachers' decision making during instruction. As such, its theory-in-progress is the first to be generated systematically from data. While no claim is made regarding the generalizability of the emerging theory, it provides a useful starting point for subsequent research efforts. Other grounded theory researchers might incorporate these hypotheses as the intial, working hypotheses in their studies, guiding their data collection and analysis; meanwhile, quantitative researchers might test these hypotheses in verification studies.

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